

# Air-Ground Cooperation Perspectives

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**A**IR-GROUND cooperation (AGC) is the interaction of air and ground forces to ensure the synchronization, coordination, and integration of air operations with the joint commander's campaign plan. Current warfare is moving into an era of dramatic political, technological, and doctrinal change, so AGC must keep pace.

Over the years, there have been persistent concerns regarding AGC's effectiveness, responsiveness, and efficiency. Controversies over Operation Anaconda in Afghanistan and special operations forces (SOF) actions in northern Iraq, for example, are simply the latest in a string of such concerns that stretch back to World War II.<sup>1</sup>

Ground officers have complained that air support is too often insufficient in both volume and timeliness. Airmen's response is that ground officers have too limited a focus and are uninformed on the nature of air operations. The services need to identify the factors that have most often led to trouble and highlight instances where innovation has improved joint operations.

## Factors for Discord

The services' unique characteristics reflect their inherent strengths and limitations. Wise commanders and planners search for the best joint mix and the best concept of operations that will maximize individual components' strengths while masking or minimizing their limitations. Nonetheless, the funda-

mental differences between the services, based on the medium in which they primarily operate, plus decades of cultural traditions and institutional history, give soldiers, sailors, airmen, and marines unique perspectives on war.

**Service cultures.** The services have distinct personalities that shape force structure and doctrine. Their cultural inclinations result from historical experiences that resonate deeply within each service.<sup>2</sup> For example, in the past, Air Force interest in strategic bombing led to Army perceptions that the Air Force did not take AGC seriously. This doubt was reinforced in Korea and Vietnam where the Air Force was not prepared to conduct effective tactical air operations at the outset of hostilities. Although airmen quickly addressed the problems, concerns remained. Those concerns led to complaints as well as attempts to assign Air Force fighter-bombers directly to ground units and to develop combat helicopters that could provide traditional close air support (CAS) and air interdiction (AI).

Similarly, the Marine Corps recalls the events that occurred at Guadalcanal, where marines were dependent on Navy gunfire and carrier-based aircraft for fire support. The fear of Japanese air and naval attack caused the aircraft carriers to leave the marines on the beach without fire support. To prevent a recurrence, the Marine Corps eventually formed marine air-ground task forces (MAGTFs), which were combined arms units designed to work together

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as a single force. The Marine Corps has resisted all attempts to split the MAGTF by assigning its forces—air or ground—to another service.

**Perspective.** Perspective is another source of contention. The Air Force maintains that an aircraft's ability to strike anywhere within a theater means that air leaders must think in a similarly broad vein. On the other hand, ground commanders' concerns have traditionally been with the area to their front, stretching out to perhaps 30 miles. Although concerned about activities beyond that, their interest is not as immediate. This issue has received increased visibility because a number of the Army's organic fire support weapons now have enhanced range capabilities.<sup>3</sup> More important, the rapid move on Baghdad in Operation Iraqi Freedom by U.S. ground forces signaled a dramatic new capability. If ground commanders can shoot deep and move deep quickly, they will be more inclined to think deep.

**Battle rhythms.** The services' different battle rhythms, operational tempos, and planning cycles are also at issue. In the case of land combat, for example, there exists a phenomenon known as the culminating point, where operations surge forward but then slow down to allow soldiers to regroup, rest, and bring fuel, food, ammunition, and supplies forward. This pause is generally preparatory to another surge, as for example, the 3-day halt outside Baghdad in Operation Iraqi Freedom preparatory to the final drive on the city.

In air operations, a culminating point seldom exists. Instead, airmen generally conduct combat air operations at a high pace for an indefinite period. In Operation Allied Force, NATO air assets, although dependent on political constraints as well as weather, operated at a high and nearly continuous tempo for 78 straight days.

Air and ground operations' planning cycles are dissimilar. The joint force air component commander (JFACC) or the coalition force air component commander (CFACC) develops the air tasking order (ATO) that manages all theater air assets. Although

the JFACC or CFACC updates the ATO daily, planning begins 72 hours in advance of each day's operation. Historically, the ATO has left room for operational flexibility during execution, including the ability to respond to immediate and time-sensitive targets. Flexibility occurs through scheduling sorties that have no designated targets. Aircraft take off and report to a specific area or controller for directions.

Commanders submit routine ground-force requests for air support in advance through tactical air control parties at each ground headquarters from battalion to corps. The joint force land component commander (JFLCC) or the coalition force land component commander (CFLCC) prioritizes air requests. Once having consolidated the prioritized air support request, the JFACC develops the ATO.

The JFLCC also has a theaterwide focus, which is reflected in the objectives that he assigns to subordinate units during each phase of an operation. The JFLCC's operations order (OPORD) defines overall land-force objectives, describes the enemy threat, assigns missions, allocates forces to the various corps, and provides guidance applicable to the immediate battle area.

The OPORD-generation process, repeated at each ground-force echelon, has a threat, objective, and task organization peculiar to its mission and geographic sector. Each OPORD's primary components include a scheme of maneuver and a fire support plan plus annexes for other supporting activities. The ground planning staff initiates OPORD components before an operation. Rarely does this occur 72 hours in advance. Often, new OPORDs result from a changing threat; a revised objective or mission statement; or a requirement to move beyond existing sector boundaries. Each new OPORD results in intense, time-sensitive planning activities. Ordinarily, the ground-planning staff can generate a corps OPORD and a nested family of supporting OPORDs in a matter of hours. In short, the respective planning cycles for air (deliberate and orderly) and of ground (episodic and reactive) staffs do not

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**Prioritizing air assets.** Because of the differences in perspective and rhythms, air and ground officers often disagree regarding air priorities. Airmen see gaining air superiority as the joint force's primary objective, although the services often differ on how best to attain that air superiority. For example, the Air Force wants air superiority gained quickly over the entire theater so it can conduct other air operations simultaneously without threat. Attaining this degree of dominance usually entails an offensive campaign to destroy or neutralize the enemy's air force, his command and control (C2) system, and his ground-based air defenses. The last is important. If enemy air defenses are left intact, some friendly air missions, such as AI, CAS, reconnaissance, and airlift, which are essential to the joint force, can become problematic. The other services do not always see such all-encompassing air superiority as necessary. Soldiers and marines are most concerned with the air above their heads, and sailors are most concerned with the air above their fleet.

Airmen also often see long-range strike as most supportive of the joint force commander's goals. If the intent is to shape the battlefield, then hitting the enemy as far back as possible seems logical. In this view, it is wiser to destroy enemy tanks, trucks, and infantrymen before they close with friendly forces. As a result, AI is often seen as a more effective and, thus, a higher priority mission than is CAS. A common metaphor that airmen use is that of attempting to dam a waterfall; it is far easier to stop it at its source above rather than stand at the bottom with a handful of buckets.<sup>4</sup> To the soldier, the immediate battle is of paramount importance, so he would accord CAS the highest priority. Interdiction of enemy reinforcements would be of little importance if friendly forces were overrun in the meantime.

In truth, airmen do not see things so starkly. When friendly forces are in danger, commanders divert all air assets to protect them. However, the military

should not use airpower as a substitute for artillery. If organic fire support is available, it should be used. Only if fire support is inadequate should there be a request for airpower. Still, airmen jettison this view when air assets are abundant. For example, in South Vietnam, the Air Force flew nearly 4 million sorties in support of ground forces; over 633,000 were classified as CAS.<sup>5</sup>

Another exception to airmen's belief in the efficacy of AI over CAS concerns the Marine Corps. Before World War II the Marine Corps developed a doctrine of amphibious operations that employed a quick, sharp, unexpected assault against a defended coastline. Because of the emphasis on speed and agility, the Marine Corps did not have the organic firepower (heavy artillery or tanks) necessary to ensure force protection over an extended period. Carrier-based air or naval gunfire would instead provide fire support. All involved expected that such operations would either be over quickly or that soldiers, who came equipped with their own fire support, would replace the marines.

After World War II, marines were not often used as amphibious strike forces. They performed the more traditional role of ground troops, such as at Khe Sanh during the Vietnam war. They used airpower as a substitute for organic fire support assets. This model has both pluses and minuses; Marine Corps air forces are highly responsive and effective, but they are inefficient in dollar terms. The question is has the evolving nature of modern war altered this cost-benefit relationship?

**Fratricide and risk.** The key area of discord among the services is the issue of fratricide and risk. The issue most directly affects the problems of responsiveness and misunderstanding. Although the services experience differing tempos and cycles, they are alike in sharing a fear of fratricide. Friendly fire is a depressing fact. During World War II, 2 percent of all Army combat deaths were caused by fratricide. In some cases, fratricide was ground-on-ground (57 percent); in others, it was air-on-ground (37 percent) or ground-on-air (6 percent).<sup>6</sup> The problem has not disappeared. During Operation

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Desert Storm, nearly 25 percent of all U.S. combat casualties were caused by fratricide.<sup>7</sup> In Operation Iraqi Freedom, U.S. Patriot batteries shot down the first two coalition fixed-wing aircraft lost. Soon after, an Air Force A-10 attacked U.S. marines.

Besides the increased lethality and accuracy of U.S. weapons, battlespace nonlinearity has been a major problem in Afghanistan and Iraq (as it was in Vietnam and Kosovo). Time-honored methods of designating positions by lines on a map are less useful in a nonlinear battlespace. Identification and location problems are more complex because of the increased presence of coalition or indigenous ground forces, with which U.S. forces have had only limited cooperation in the past. An added complication is the increasing prevalence of small, mobile targets.

Related to the issue of fratricide is the growing concern over risk to aircrews. Beginning with Operation Desert Storm, the United States has sustained amazingly light casualties in combat. In the 78-day Operation Allied Force, for example, only two NATO aircraft were shot down, and both pilots were quickly recovered. In Operation Iraqi Freedom, only one aircraft was lost to enemy fire, and the pilot was recovered. Such events have set a high bar for U.S. military operations. In fact, during Operation Allied Force, NATO commander General Wesley K. Clark specifically instructed his CFACC that a prime consideration of the air campaign was to minimize friendly air losses. NATO cohesion was shaky, and he feared that significant aircrew casualties would split the alliance and end the operation.<sup>8</sup>



An A-1E Skyraider attacks Vietcong guerrillas, 1965.

Fratricide and risk have had an increasingly major effect on AGC. The unusually bloodless conflicts of the past 12 years have made political leaders somewhat risk averse. Military commanders have responded by implementing more stringent rules of engagement

(ROE) and tactical procedures.<sup>9</sup> In some cases this has resulted in elaborate identification methods for friendly ground troops and their precise locations. But, with attempts to limit fratricide come complications. In Afghanistan and Iraq there were “no engagement zones,” “limited engagement zones,” “special engagement zones,” and “special operations areas,” all of which had their own ROE and which were often controlled by different agencies or services that were not necessarily in direct or continual contact with each other.

Another tension within the fratricide and risk issue concerns platforms and ordnance employed. Air ordnance might have several desirable characteristics—speed, accuracy, persistence, lethality, cost, and availability—that dictate what weapons and platforms forces need. But, such flexibility is difficult to achieve. Although a force might need a stealthy platform because of enemy air defenses, F-117s or B-2s might be unavailable. Similarly, although aircraft might contain high-explosive bombs, the target might require cluster bomb units. Attempting to match platforms and ordnance with targets, especially targets of a pop-up nature, is a challenging proposition.<sup>10</sup> As a result, the military is developing the following:

- “Dial-a-yield” and “dial-a-fuze” weapons, which can be set in the cockpit.
- Small diameter bombs.

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- Standoff weapons, which could employ both laser and Global Positioning System (GPS) guidance.

- Personal transponders to keep track of friendly forces.

- Improved sensors and data links to both the cockpit and the ground.

In a more general and more important sense, however, the desire to avoid fratricide and risk has meant a dramatically increased need for battlespace awareness. Ground and air forces must be aware of the *precise* location of friendly forces as well as enemy forces, potential targets, enemy air defense sites, and civilian personnel and facilities. Only by possessing such broad yet detailed intelligence can joint commanders confidently employ force.

New or improved sensors such as unmanned aerial vehicles, satellite imagery, and aerial reconnaissance are addressing the expanding intelligence need. In addition, ground forces can use GPS receivers to determine accurately their own positions—regardless of the terrain or weather—as well as that of the enemy. Ground forces could then pass enemy coordinates directly to strike aircraft.

The cost of developing the requisite sensors, interfaces, and analysts is not the only downside to this enhanced sensor-to-shooter capability. The extra time required to employ such systems is also a factor. Commanders, increasingly mindful of ensuring the accurate, safe employment of force, often take more time to reach a decision than was the case when they had less input to consider.

Old concerns regarding the timeliness of air support—in the past often a function of technological limitations—are now more apt to be the result of an elongated decision cycle occurring at headquarters; it is a human problem. Operations in Afghanistan seemed to confirm this new twist to an old problem.<sup>11</sup> Fortunately, the CFACC learned from this experience. In Operation Iraqi Freedom, he established a “time-sensitive target cell” responsible for fast-tracking air responses to key targets.<sup>12</sup> The new cell handled the strikes on 156 crucial targets, including leadership, weapons of mass destruction, and terrorists targets. Through the same process, the force

struck 686 “dynamic” targets, including high-value mobile targets that did not fall into the other categories.<sup>13</sup>

The end result of the fratricide and risk issue, combined with the modern, nonlinear battlespace's nature, was to bring into even sharper focus operations tempo and cycle issues. While airmen are more concerned about carefully planning strikes, the operational situation places enhanced emphasis on fluidity, flexibility, and responsiveness.<sup>14</sup>

## Catalysts for Change

An examination of AGC's history shows that many changes have occurred technologically, structurally, and doctrinally. Leadership, technology, and wartime experience drives such changes. Sometimes, change occurs only when creative, bureaucratically fearless leaders step forward to impose change on balky services. Imagining Army AirLand Battle Doctrine occurring without Generals William DePuy and Donn Starry is difficult.<sup>15</sup> On the other hand, nameless officers at various schools, doctrine centers, and operational units have also made valuable contributions over the decades, even if they cannot be singled out.

Necessity is indeed the mother of invention. Adaptations to AGC have included, *inter alia*, the following:

- The use of radio communications between aircraft and ground elements.

- High drag or “parafrag” bombs to allow accurate delivery at low altitudes.

- Radar bombing techniques.

- Increasingly accurate precision guided munitions (PGMs).

- The Joint Tactical Intelligence Data System.

During Operation Desert Storm, coalition aircraft employed infrared sensors to detect Iraqi tanks and other armored vehicles in the desert, which were then “plinked” with laser-guided bombs. In Afghanistan, U.S. forces began “blue force tracking,” which uses a miniature transponder that relies on GPS satellite signals relayed to ground and airborne receivers. During Operation Iraqi Freedom, forces

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used thermal panels to designate coalition vehicles, and the CFACC established an air component coordination element in seven ground headquarters to facilitate cooperation and to limit misunderstanding between air and ground components.

One does not have to be in war to be creative and adaptable. U.S.

armed services and the joint community have a robust lessons-learned program. Even while an operation is in progress, the military is gathering information on what happened and why; what planning assumptions were valid or invalid; and what weapons and concepts were more or less successful than anticipated. The services conduct rigorous reviews and more important, they use lessons to look ahead. Certainly not all is perfect in such efforts, but the U.S. military has been remarkably willing to examine itself, recognize problems, and effect change. In the aftermath of the Vietnam war, for example, the Air Force fundamentally changed its force structure, doctrine, and leadership and veered from a decades-long affiliation with strategic bombing to a more conventional, tactical and operational-level focus.

## Solutions

Joint operations, especially at the tactical level, are extremely complex because of the services' differing weapons, ordnance, C2 structures, doctrines, and perspectives.<sup>16</sup> At times, this can introduce numbing problems, such as the following:

- Ground forces using FM radios that cannot



US Air Force

talk to F-16s overhead because the airmen have only ultra-high frequency or very high frequency radios.

▫ Special operations forces AC-130 gunships not being in contact with Navy or Marine Corps aircraft operating in the same area.

▫ Marines on one side of the Tigris not having the correct frequencies to talk

to soldiers on the other side.

▫ Unmanned aerial vehicles operated by the CIA targeting a facility already scheduled for attack by military aircraft.

These complexities, mixed with intrinsic factors of differing service cultures, perspectives, battle rhythms, and overarching fratricide and risk factors, make for an unusually difficult AGC mission.

**Technology.** Currently, the services are pursuing a host of initiatives to enhance AGC, including—

- Precision or standoff ordnance.
- Communications gear and intelligence sensors common to all the services, such as Link-16.
- Robotic battle damage assessment systems.
- Automated target recognition systems.
- New aircraft, such as the joint strike fighter.

Some new technologies will be transformational; others will be “merely” evolutionary. Asking whether new technologies will allow the services to perform the same tasks more effectively and efficiently or to perform entirely new tasks is imperative.

For decades, airmen have said that aircraft are not “flying artillery.” The Marine Corps is the exception to believing this. To maintain agility in an

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amphibious or forced-entry scenario, the Marine Corps has substituted air for artillery and armor. The Air Force response to this model has been to point out its expense and inefficiency. Perhaps it is time to rethink this issue.

Recent new technologies, such as stealth technologies, increasingly accurate PGMs, and stand-off weapons, have greatly reduced the risk associated with CAS missions to air-

men as well as to friendly ground forces. Moreover, improved accuracy means the services need fewer weapons to achieve the same effect, which means fewer aircraft will be needed.

Using heavy aircraft (B-1, B-2, and B-52) allows a far greater loiter time over the battlespace, which translates into enhanced persistence. In Afghanistan and Iraq, the B-1 and B-52 spent up to 8 hours orbiting designated sectors while waiting for ground spotters or other intelligence sensors to identify targets of opportunity.

During Operation Desert Storm, airmen also innovated with Push-CAS and kill boxes to enhance the ability to provide responsive air support.<sup>17</sup> Now might be the time to consider aircraft as a substitute for Army artillery in some situations. But, there are tradeoffs. Artillery generally offers greater responsiveness and persistence, while air-delivered ordnance is usually more accurate and lethal. Although air assets can never replace organic fire support assets, examining whether substitution is



An A-10 Warthog provides CAS to ground troops during an operation outside of Kirkuk, Iraq, 24 September 2003.

sometimes possible is worthwhile.

**Operational concepts.** Jointness is a way of life. The services or functional staffs often plan current military operations, which the components (working together but separately) implement. In other words, CFACC and CFLCC staffs plan an operation; coordinate plans with the other components; and pass them upward to the combatant commander for

approval. The component units conduct their own tactical planning and preparations, coordinating their activities with each other. The services then conduct the operation. The U.S. military has no joint tactical units that contain both air and ground elements, with the notable exception of some SOF units.

Afghanistan saw the unusual situation where the CFACC deployed forward to the theater, but the combatant commander and his staff remained in Florida. For Operation Iraqi Freedom, U.S. Army General Tommie Franks deployed forward, but to a location different from that of the CFACC. The CFLCC's headquarters was in yet another location.

Separate but equal service and functional staffs, which include some degree of liaison with each other, might be insufficient to keep pace with modern war's frenetic nature. Forming a joint battle staff, which would include the physical presence of the CFACC and the CFLCC and other component and functional commanders under the combatant commander's control, might be feasible. The staff would be truly

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joint, thus eliminating the need for liaison elements that might or might not be effective in coordinating joint combat operations. (The air component was not well integrated into planning for Operation Anaconda. Poor coordination caused serious consequences in the battle, which having a single battle staff could have eliminated.)

The unified commands are now experimenting with such units as standing joint task forces, but a recurring problem has been the dearth of qualified personnel to staff them in times of crisis. The Pacific Command and the European Command first addressed this issue, and now the Joint Forces Command has been assigned the problem.

Ground-assisted precision strike (GAPS) is a new concept that looks at AGC through a new lens.<sup>18</sup> In Bosnia, Kosovo, Afghanistan, and Iraq, traditional CAS and AI missions have been stretched almost beyond recognition. CAS assumes there are friendly troops in close proximity, which requires detailed coordination between air and ground elements. AI involves destroying or disrupting enemy forces and their supply lines before enemy forces can engage friendly forces.

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A sergeant with the 4th Air Support Operations Group communicates with an A-10 "Hogdriver" in northern Iraq, 24 September 2003.

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GAPS might prove not to be a useful concept and be abandoned. The Army views GAPS with some suspicion and wonders if the Air Force is backing away from a commitment to CAS.<sup>19</sup> Still, there are similarities between GAPS and the battlefield air interdiction (BAI) concept, an idea that the Army and

NATO have supported but that the Air Force did not wholeheartedly accept. Perhaps the issue is just another example of a struggle over control. In BAI, the ground commander would nominate targets in front of the fire support coordination line but not in close proximity to friendly forces. In GAPS, an airman would select the targets (as in AI) and control air assets. If this issue is the real point of contention, it is an unworthy concern. The focus, as always, should be on achieving objectives at the least cost.

**Education and training.** Over the past decade, the services have made great strides in fostering and implementing joint training and education, which has forced the services to learn more about each other. The Army and Air Force hold warfighting conferences annually as a way of highlighting mutual problems and effecting solutions. Also, the increasing power of the unified commands and their staffs



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places great emphasis on jointness at the warfighting level. This is good. However, more could be done at the tactical level.

A recent General Accounting Office report, critical of AGC joint training, notes that such training is infrequent, unrealistic, and nonstandardized.<sup>20</sup> The Air Force chief of staff echoed this concern, noting that too often air and ground units approach joint exercises with service-centric training objectives. CAS is avoided so ground forces can exercise their close combat capabilities.<sup>21</sup> Perhaps, given the critical stake that all of the services have in its effectiveness, AGC would be an area in which to experiment using joint tactical units. The services must increase and take more seriously exchange and liaison positions. For example, although the Air Force and the Army have designated slots in each other's command and staff echelons, the positions are not always fully manned. Worse, such assignments are not always seen as "career enhancing," which means that individuals are reluctant to work in such joint billets for fear of hurting their promotion opportunities.

All of these concerns call for an increase in joint

exercises and simulations that employ new concepts and, perhaps, new joint tactical units. In the past, the Army and Air Force have generally trained together only during major exercises and actual contingencies. Joint tactical exercises with the Navy and Marine Corps are even less frequent.<sup>22</sup> This must change.

Air-ground cooperation, one of the oldest and most important of all joint missions, is one of the few instances (while also being one of the most dangerous) when all of the services should be operating together at the tactical level. Because of decades-old traditions and differing viewpoints, effective cooperation has been a substantial challenge. More important, however, the twin dangers of fratricide and risk have been the root cause of endless troubles and controversies. New technologies and new warfighting concepts offer innovative and possibly transformational ways to solve these chronic problems, beginning with a dramatically heightened battlespace awareness. Warfare itself, and adversaries' clever moves and adaptations, require continued refinement of air and ground abilities, both in the technical and in the creative realm. **MR**

## NOTES

1. For the Army view, see MG Franklin L. Hagenbeck, "Afghanistan: Fire Support for Operation Anaconda," *Field Artillery* (September-October 2002): 5-9. For the unofficial Air Force version, see Rebecca Grant, "The Airpower of Anaconda," *Air Force Magazine* (September 2002): 60-68. Regarding northern Iraq, reports coming out of the theater indicate confusion and misunderstanding between SOF in the field and the combined air operations center over attempts to schedule and manage air assets.

2. For a good overview, see Carl H. Builder, *Masks of War: American Military Styles in Strategy and Analysis* (Baltimore, MD: Johns Hopkins University Press, 1989).

3. The Army's fire support weapons with enhanced range capabilities include the Army Tactical Missile System, the Multiple Launch Rocket System, and attack helicopters.

4. The view that it is easier to stop a problem at its source was codified early in World War II, as seen in U.S. Army Field Manual (FM) 100-20, *Command and Employment of Air Power* (Washington, DC: U.S. Government Printing Office [GPO], 21 July 1943), 10-11.

5. Headquarters, AF/XOOCOAB, "USAF Combat Sorties in Southeast Asia" (Washington, DC: GPO, 5 April 1974), chart.

6. Center for Army Lessons Learned (CALL), "Fratricide," *CALL Newsletter*, Fort Leavenworth, KS, 92-4, appendix D.

7. LCDR William H. Ayers, "Fratricide: Can it be Stopped?" *Global Security Report* (Quantico, VA: U.S. Marine Corps University Command and Staff College, 1993). 3. U.S. combat losses have decreased so dramatically in the past two decades that, although incidents of fratricide are few, they constitute a higher percentage of total casualties.

8. GEN Wesley K. Clark, *Waging Modern War* (New York: PublicAffairs, 2001), 183.

9. Rowan Scarborough, "Risk Concerns Hamper Hunt for Taliban," *Washington Times*, 9 December 2002, A1.

10. In Operation Iraqi Freedom, B-1s were generally loaded with twenty-four, 2,000-pound joint direct attack munitions (JDAMs), half of which were penetrators. The other half were fuzed for detonation on impact. JDAMs allowed some targeting and employment flexibility, but more could be done.

11. Thomas E. Ricks, "Target Approval Delays Cost Air Force Key Hits," *Washington Post*, 18 November 2001, A1. When intelligence indicated the possible whereabouts of Saddam Hussein during Operation Iraqi Freedom, coalition aircraft were able to put bombs on the location within 12 minutes. Obviously, the target's importance generated an unusually rapid response. See also David A. Fulghum, "Bag of Tricks," *Aviation Week*

& Space Technology (21 April 2003): 22.

12. Tom Bowman, "Strike Team Advances Precision, Pace of War," *Baltimore Sun*, 20 April 2003, 1.

13. U.S. Central Command Air Forces (USCENTAF)-Prince Sultan Air Base, Assessment and Analysis Division, "Operation Iraqi Freedom—By the Numbers" (Shaw Air Force Base, SC: USCENTAF, 30 April 2003). 9. See also on-line at <www.urbanoperations.com/oicentaf.pdf>.

14. Attempts to bring civil charges against U.S. pilots during Operation Desert Storm and in Afghanistan spotlight the dangers surrounding fratricide and collateral damage. Individuals in Belgium have filed charges against Operation Iraqi Freedom commander General Tommy Franks for being responsible for civilian casualties in Iraq. If such efforts gain traction, they can only add to concerns over battlespace awareness, which in turn might elongate the decision cycle.

15. Paul H. Herbert, *Deciding What Has to be Done: General William E. DePuy and the 1976 Edition of FM 100-5* (Fort Leavenworth, KS: Combat Studies Institute, 1988); John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-1982* (Fort Monroe, VA: U.S. Army Training and Doctrine Command, 1984).

16. This article specifically does not address the issue of who controls AGC air assets. In the past, this issue has generated more heat than light. By defining it out of the solution set, the focus is more on practical possibilities.

17. Eliot Cohen, ed., *Gulf War Air Power Survey* (Washington, DC: GPO, 1993), II, 266-93, 301-302. Some have referred to "option lock-in"—the danger of being inflexibly committed to a certain plan of action—simply because the planning cycle is too slow and cumbersome to modify.

18. For background, see LTC Phil M. Haun, "Direct Attack—a Counterland Mission," *Air and Space Power Journal*, XVII (Summer 2003): 9-16.

19. See for example, LTC John M. Jansen, USMC; LCDR Nicholas Dienna, USN; MAJ Todd Bufkin II, USMC; MAJ David I. Oclander, USA; MAJ Thomas D. Tomasso, USA; and MAJ James B. Sisler, USAF, "JCAS in Afghanistan: Fixing the Tower of Babel," *Field Artillery* (March-April 2003): 22-30.

20. General Accounting Office (GAO)-03-505, "Military Readiness: Lingering Training and Equipment Issues Hamper Air Support of Ground Forces" (Washington, DC: GAO, May 2003), 2.

21. Fulghum, 37.

22. GAO-03-505, 10, 17.